EAST NEW BRITAIN PROVINCIAL ADMINISTRATION

GAZELLE DISTRICT

INLAND/LASSUL BAININGS (TORIU) INTEGRATED AGRICULTURE, INFRASTRUCTURE AND REFORESTATION PROJECT

GAZELLE DISTRICT ADMINISTRATION
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KEREVAT
EAST NEW BRITAIN PROVINCE

EAST NEW BRITAIN PROVINCIAL ADMINISTRATION
PROVINCIAL EXECUTIVE COUNCIL

OFFICE OF THE: CHAIRMAN
FISHERIES & FORESTRY

POLICY/ ~~INFORMATION PAPER~~: PDT/PS: 08 /2006

SUBJECT: **COCOA\CASH CROPS DEVELOPMENT INLAND\ LASSUL BAINING, REFORESTRATION, INFRASTRUCTURE & AGRICULTURE PROJECT.**

1. PURPOSE

The purpose of the submission is: -

a) Inform PEC of the intentions to develop and establish a Cocoa Nucleus estate within the Gazelle District, through Inland Baining down to the coast of Lassul Baining.

b) Seek PDT approval for the establishment and development of the project for the benefit of the people.

2. BACKGROUND

Agriculture is the only sector in the short to medium term capable of absorbing the new and unskilled entrants to the work force.

The importance of Agriculture in job creation, poverty alleviation and export earnings is likely to remain undiminished during the coming years, and may even increase due to the depletion of non-renewable resources such as gas, oil and minerals.

The proposed development of an Oil Palm Project is one of the key " **Impact Projects"** of the East New Britain Provincial Government in that the project is expected to have a significant impact on the rural areas where 85% of the people live.

3. FACTS AND CONSIDERATIONS

The National Government of Papua New Guinea has an **"Export Driven Economic Recovery Policy"**, which encourages and tries to sustain business growth both in urban and rural areas of the country.
The Inland and Lassul Baining, Reforestation Infrastructure and Agriculture Project is one such business and that can be developed to stimulate a more a sustainable business growth in the area where the people have been aspiring over the years to commence an agricultural project in order to alleviate the state of poverty they have been in until now.

The landowners through their landowner company, Aldam Malara Timber Company Ltd, have in principle agreed for the Papua New Guinea Forest Authority (PNGFA) to develop their land through reforestation. A total of 10,000 hectares have been earmarked for this.

Species to be planted are high value ones like Teak (Tectona grandis) and Kamarere (Eucalyptus deglupta). PNGFA is very much appreciative of the landowner's consent and looking forward to working with the landowners.
The benefits will be enormous, as it will come through contract labour, thinning and clear felling. With the high value species, monetary benefits derived are very huge.

With the increased monetary benefits, this will impact directly on the peoples standard of living. Further to that the respective levels of governments will gain from the various taxes imposed.

To minimize the environmental impacts of the road development within the project area, it is anticipated that the roadline should avoid as much as possible traversing through the headwaters where the rivers, streams and creeks originate but rather it should cross them instead.

The costing associated with the new construction of each kilometer of road as per the Department of Works Specifications are estimated according to the type of terrain that this road will traverse which is mainly through hilly and mountainous areas. The cost estimate would be K400,000.00/km which comprises the following:

(a) Road Dimensions

- ➢ Clearing and grubbing Width -10m
- ➢ Formation Width - 8m
- ➢ Sheeting - 6m
- ➢ Sheeting thickness - 200mm

b) Allowance for 4x900CMP/km has been made
c) Allowance for 1x2400 Arch pipe/km has been made
d) All CMP to be 9.6m lengths
e) All Arch pipes to be 12.0m in lengths

The total length of the roads will be 71.5 kilometers long.

The intention is to establish a nucleus Cocoa/Cash Crops project by utilizing the logged area in the Inland and Lassul Baining of Gazelle District. A total of 4,000 hectares will be undertaken to participate in this dynamic industry. Interested landowners from Konako and Mobilum will have their land developed under the co-operative scheme with the community Coca and Cash Crops concept as further out growers.

The area concerned consists of 600 households with a population of 5,500 people with the main source of income being Agriculture through subsistence farming. Communal labour, which is common and still very strong in the area, would be very useful in the actual implementation of the Cocoa project.

The benefit for such a project will be enormous. The Cocoa/Cash Crops project would absorb a large population work force, which is required by a project of this magnitude. The project will directly lead not only to opening up the area to other economic activities but also create other spin off benefits as a result. It will provide consistency of cash income and improve living conditions. The governments would benefit from taxes and regular maintenance of the road network

4. IMPLICATIONS.

4.1 ECONOMIC

There will be a shift and a complete turn around for the economy of the Landowners, LLG's, Gazelle and East New Britain as a whole.

4.2 FINANCIAL

A project of this nature requires an initial substantial amount of investment. The Landowner Company will be sourcing working capital from institution or to seek other private investors for this project.

4.3 PLANNING

This project is in the **"North Baining Corridor Plan"** for the Provincial Government.

4.4 POLITICAL

This project has the support of all the members of Inland and Lassul Local Level Governments. Both presidents of the two LLG's have been very supportive through the consultation as well as facilitation of meetings for the landowners to be active partners in the development of the project.

4.5 SOCIAL

The social well- being of the local population (landowners) will improve a lot as the project will create a sustainable economy as well as a regular maintenance of the road network, which will be utilized for the delivery of other social services.

4.6. LEGAL

Nil

5. VIEWS OF OTHER MEMBERS.

This is being sought at this meeting.

6. RECOMMENDATIONS

It is recommended that the PEC:-

1. That the PEC approves the establishment and development of the cocoa and other cash crop initiatives in the project area.
2. That the committee endorses the proposal by developers of the project to seek Levy incentives for the various projects on the ground.
3. That an extensive awareness on the project implications be conducted by the District and other stakeholders before the project starts.
4. That a Baining Co-operative Society be established to accommodate the 22 Incorporated Land Groups.
5. That the formation and consolidation of Baining Land Right Association be undertaken.

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HON. PHILIP KAMENG MPA
Chairman DPI, Fisheries & Forestry.

REFORESTATION PROJECT – TORIU HEADWATERS TIMBER AREAS

1.0 Intruduction

The National Goverment of Papua New Guinea (PNG) has an "expert driver economic recovery policy" which encourages business activities in both the rural and urban areas.

The PNG Government has a "Reforestation Policy" as one such that encourages economic recovery through timbers volume replacement. Toriu Headwaters Reforestation Project will be one business that can be developed to stimulate a sustainable forestry business to alleviate poverty and improve the living standard.

Revenue from the forestry project will benefit all the level of government, the landowners and the Papua New Guinea Forest Authority (PNGFA).

2.0 Aim

It is our aim here to develop 10,000 hectares of forest plantation at the rate of 1,000 hectares per annum and will be over planted within the twenty-two (22) Incorporated Land Groups (ILG's).

3.0 Problem Statement

The reforestation project is situated within the villages of Malasait, Lamarain, Sapraingi, Raunsepna, Yayem, Mobilum and Konako all in both the Inland Baining and Lasul Baining Local Level Governments.

As there are not much, economic, social and infrastructure developments in the project area, the awarding of the Timber Authority (TA) for the harvesting of the timber will pave the way for the projects that are to be developed in the area. It is through this that the landowners have proposed to use their forest resources as their source of funding.

4.0 Physical Resources

a) Land – it is customarily owned by the twenty-two (22) ILG's.
b) Capital – the reforestation project is to be funded by the reforestation levy from the logging operation.
c) Tools and Equipments
    (i) Nursery Requirements – to be purchased for use in the nursery like seeds, poly bags, mesh wire, wheelbarrow, spades, shade cloth and fertilizers.
    (ii) Field Management – for use in the maintenance and management of the forest plantation like grass knives, bush knives, spades, files, pruning saws, fertilizers and chemicals.

5.0 Management

a) Technical Know-How – The Reforestation Supervisor in Kerevat will oversee all the reforestation programmes and will be ably assisted by the reforestation wage workers initially.

b) Managerial Abilities – Technical officers of the Forest Management Division of the PNGFA will be on hand to assist in the establishment, maintenance and management aspects of reforestation.

6.0 Sources of Fund

All funds required for the reforestation programme will come from the reforestation levy from the logging operation. At K2.00/m3, reforestation levy to be raised will be about K1,967,473.83.

7.0 Costs

a) Nursery establishment	-	K50,000.00
b) Field Maintenance/Management tools	-	K10,000.00
c) Establishment	-	K500,000.00
d) Maintenance/Management	-	K3,952,000.00
Total		**K4,512,000.00**

8.0 Implementation Schedule

YEAR	ANNUAL PLANTING AREA (HA)	MAINTENANCE/ MANAGEMENT AREA (HA)	TOTAL AREA (HA)
Yr 0/1 – 2006	1,000	1,000	1,000
Yr 2 – 2007	1,000	2,000	3,000
Yr 3 – 2008	1,000	3,000	4,000
Yr 4 – 2009	1,000	4,000	5,000
Yr 5 – 2010	1,000	5,000	6,000
Yr 6 – 2011	1,000	6,000	7,000
Yr 7 – 2012	1,000	7,000	8,000
Yr 8 – 2013	1,000	8,000	9,000
Yr 9 – 2014	1,000	9,000	10,000
Yr 10 - 2015	1,000	10,000	11,000

9.0 Anticipated Revenue

a) During the harvesting of the forest resources, inventory benefit will be derived as follows:

FACTS AND CONSIDERATION

As per the financial forecast for the said project, Toriu Headwaters here are the financial direct benefit that will go to the landowners, the Inland Baining Local Level Government and the East New Britain Provincial Government.

FACTS

PROJECT : TORIU HEADWATERS
GROSS AREA : 30,00,830 Hectares
OPERABLE AREA : 22,074 Hectares
INOPERABLE AREA : 8,756 Hectares
PROJECT LIFE : 10 Years
ANNUAL HARVEST : 983, 736.916 M3
ANNUAL EXPORT VOL : 83, 926.379 M3
ANNUAL PROCESSED VOL : 14,810.537M3 : (15%)
AVERAGE VOLUME/TREE : 3.850M3
AVERAGE VOLUME/HECTARE: 42.634m3

1. BENEFIT TO THE LANDOWNERS

PARTICULARS	RATE	VOLUME (M3)	AMOUNT
Royalty	K10/m3	983,736.916	9,837,369.16
Premium Levy	K5/m3	983,736.916	4,918,684.58
Agriculture Levy	K2/m3	983,736.916	1,967,473.83
Reforestation Levy	K2/m3	983,736.916	1,967,473.83
Infrastructure Levy	K1/m3	983,736.916	983,736.92
Business Levy	K1/m3	983,736.916	983,736.92
Land Mobilisation	K2/m3	983,736.916	1,967,473.83
Health/Education	K1/m3	983,736.916	983,736.92
Total K24/m3			**K23,609,685.99**

2. Benefit to the Inland Baining Local Level Government. Infrastructure Development levy will be paid to the LLG at K1/m3 for annual volume production of 983,736.916m3 which will be K983,736.92.

3. Benefit to the Provincial Government of East New Britain will be for Business, ie: Community Development levy at K1/m3 per annual volume production of 983,736.916m3 which will produce K983, 736.92.

b) Then from the established forest plantation revenue will be derived as follows:

(i) Thinning – 1st and only thinning to waste in Year 7 by 30%. Average diameter expected at this age is between 15.0cm – 20.0cm with estimated volume per hectare of 188 cubic meters. For 1,00 hectares is 188,000m3.

At 30% thinning, 56,400m3 will be removed and this can be utilized as post and poles.

Export price at 20.0cm diameter is US$42.00/m3 which will be about K7,106,400.00.

(ii) Clearfell – This will be at age 20 years. Average diameter at this stage is about 45.0cm and volume per hectare of 400 cubic metres.

Total volume for 1,000 ha. will be 400,000 cubic metres. At the export price of US $58.00/m3 the total revenue expected will be K69,600,000.00.

To minimize the environmental impacts of the road development project it is anticipated that the road line should avoid as much as possible traversing through the headwaters, where the rivers, streams and creeks originates, but rather it should cross them instead.

For instance the section between Malasaet and Alakasam will descend from about 600m above sea level to about 200m, crosses a river and then ascends again to 600m. The section between Alakasam and Mobilum will drop to about 200m for the first 6 kilometers or so and then traverses between 200m and 400m crossing three rivers. About 6 kilometers away from Mobilum the road starts to descend from 200m to 50m.

The other road running east from this road and connecting Konako on the coast will rise and fall between 400m and 500m and then gradually drop for 2 kilometers until it reaches Konako at 50m. This section of road will cross the Samber No.1 River.

The other bridge that will be constructed under this package will be over the Toriu River. This will be the most vital link as it will link to the existing road network in Open Bay to Mobilum and to Kerevat, Rabaul and Kokopo via Malasaet.

The costing associated with the new construction of each kilometer of road as per the Department of Works Specifications are estimated according the type of terrain that this road will traverse which is mainly through hilly and mountainous areas. The cost estimate would be K400,000-00/km which comprises of the following:

(a) Road Dimensions
  - Clearing and grubbing Width - 10m
  - Formation Width - 8m
  - Sheeting 6m
  - Sheeting thickness - 200mm

(b) Allowance for 4 x 900 CMP/km has been made
(c) Allowance for 1 x 2400 Arch pipe/km has been made
(d) All CMP to be 9.6m lengths
(e) All Arch pipes to be 12.0m lengths.

The total length of the roads will be 71.5km and therefore the cost of construction will be K28.6 million.

The first three streams/rivers are assumed to be approximately 40 – 50 metres wide and they are to be bridged using Hornibrooks Prefabricated Kwik Built Bridge System. This would cost about K1.8 million (K600,000/bridge).

The Toriu River, Sambei No.1 and Sambei No.2 Rivers will be bridged using Hornibrooks Prefabricated HPB3 Bridge System and the costings will be as follows:

(a)	Toriu	150m	K4,000,000
(b)	Sambei No. 2	80m	K2,500,000
©	Sambei No. 1	60m	K2,000,000

The total cost for the bridge constructions would be K10.3 million.

Hornibrooks Bridge Structures have been nominated as they are cheaper, fabricated locally and can still perform the same structural capacity as that of conventional Campact Bailey Bridges.

The rates for bridge (Prefabricated Structures) from Hornibrooks are as supplied by themselves and updated.

The estimated total cost would be K38.9 million.

This estimate was done only from desk study therefore it is recommended that prior to the developer commencing the road and bridges constructions, a proper survey and design be carried out, by engaging an Engineering Consultant. This is to ensure that the road and the bridges to be constructed conform to the approved Department of Works Roads & Bridges Specifications. This consultancy work will cost approximately K1.7m which would bring the estimated cost to K40.6m.

The Terms of Reference (TOR) for the above consultancy work can be prepared by the Gazelle District with assistance from Technical Officers from the Divisions of Technical Services and Planning & Research.

1. INTRODUCTION

The National Government of Papua New Guinea has an **"Export Driven Economic Recovery Policy"**, which encourages and tries to sustain business growth both in Urban and Rural areas of the country.

The Inland and Lassul Baining, Integrated Agriculture Project is one such business and that can be developed to stimulate a more sustainable business growth in the area where the people have been aspiring over the years to commence a cocoa development project in order to alleviate the state of poverty they have been in until now.

The timber resource is the only means of bringing development in terms of financial support to the area. The revenue from the timber resource will also boost the capacity of internal revenue to the Local Level Governments (Inland Baining & Lassul LLG's), which are currently struggling to make ends meet.

2. PROJECT DESCRIPTION

2.1 Location and size

The proposed Agriculture project is located approximately 30 degrees south from Kokopo Township, some 100 kilometers in the Inland and Lassul Baining LLG areas of Gazelle district.

The physical or geographical features of most of the areas within the forest area is generally low lying at an elevation of 200-1000 meters above sea level and undulates to mountains in some areas in the interior further inland. The forest is in its virgin state with small pocket of human impact activities towards the coast especially near Konako, Mobilum and Pondo. Other human impact activities have occurred around Malasaet, Yayam, Raunsepna, Alakasam and Lamarain. More than 80% of the forest area is virgin forest with soil types varying from rich black to brown clay loam soil. All the soil types of the area are well drained and fertile which are suitable for agricultural and reforestation activities. The rainfall season vary from May to October each year with the highest rainfall normally recorded between the month of December and February, of around 3000 millimeters per year.

2.1.1 Climate

The timber area lies in an area generally classified as wet lowland rainforest, which is quite humid at times, with an average annual rainfall of 3,000 millimeters. The annual mean maximum temperature is 33.7 degrees centigrade with an annual mean minimum temperature of about 18.9 degrees centigrade.

2.2.2 Geology

The land in the project area is partly volcanic and is situated within the Finisterre-New Britain Volcanic arc structural region. Eocene Limestone, classified as Baining Volcanic, underlies the upper Crust volcanic formation. The top sediments and limestone's support the forest cover of the area.

2.2.3 Soils

The Soils of the area are described as;

Rendolls:	Shallow, dark, weakly acid to neutral soils formed on calcareous parent material. Erodibility low.
Entropepts:	Slightly to moderately weathered soils with an altered "B" horizon and high (over 50%) subsoil saturation values.
Tropothents:	Undifferentiated mostly shallow soils typically found in wet climate on moderated to steep slopes.

3. SOCIO – ECONOMIC PROFILE

The proposed area consists of 600 Households. The population is 5,500. Villages such as Malasaet, Lamarain, Sapraingi, Alakasam, Raunsepna, Yayam, Mobilum and Konako are all situated within the area in the Inland and Lassul Baining LLGs.

The main source of income for the people is virtually subsistence in nature. Subsistence farming is a normal way of living for these landowners. The village people do get a little bit of cash earning from the planting and marketing of peanut, taro and other vegetables.

3.1 Demography

The population in this area is concentrated in the lower ridges. Where it is discovered that the population here is somewhat low compared to the Gazelle Peninsula.

3.2. Transport

Transport system is available only up to Raunsepna and Malasaet villages by purely land transport 4 x 4 where government services and other garden produce reach markets in Kokopo and Rabaul. There are daily runs during good weather to urban centers where goods and services are obtained.

4. AIM

To develop 2,000 hectares of hybrid cocoa within a period of three years for twenty-two (22) Incorporated Land Groups (ILG's).

5. PROBLEM STATEMENT

The project area is situated within the Inland and Lassul Baining Local level governments of Gazelle district. The representatives of the people have been requesting assistance for identified development projects from the Government but because of funding constraints, these identified projects are yet to be funded and implemented.

To date the people of these areas have not seen much development in the area except for an existing road that links the villages of Raunsepna, Malasaet, and Lamarain to the urban areas of Kerevat, Kokopo and Rabaul. Other forms of Government assisted projects include cardamom, coffee, vanilla and a DPI/NARI demonstration farm at Anesmetki.

The people of the area have been involved in cash income earning opportunities through smallholder cardamom farming since the 1980s and have expanded plantings to about 4,000 hectares to date. Statistics have shown that most of the small holder cardamom production from East New Britain Province actually originates from this particular area. However, there is a great deal of potential to expand the crop as well as introduce others such as coffee, cardamom and Oil Palm, which can be successful in the area. The biggest hindrance to further expand and implement other agricultural development in the area is the accessibility in terms of roads that will ease the biggest problem of transporting agricultural produce to the markets in the urban areas of Kerevat, Kokopo and Rabaul.

However, the pressure on land due to population increase has forced the people to seek avenues to put in place road infrastructures that will enable the people to have access to undeveloped land that they will further develop through agriculture to help sustain a normal healthy livelihood. It is through this thinking that they have come up with this proposal to help them use their own forest resources to develop their land without asking assistance from the government.

6. PHYSICAL RESOURCES

6.1 Land

The land due for logging activities is customary owned by the people from the area of which 2,000 hectares will be developed into cocoa for the 22 Incorporated Land Groups (ILG's).

6.2 Capital

Cocoa development in the area will be funded under the Agricultural Levy from the logging operation.

6.3 Manpower

Communal labor by the landowners will be involved in the tasks of lining and shade establishments of the smallholder blocks for the 22 ILG's. The loggers will carry out clear felling.

6.4 Tools and Equipment

a) Nursery Requirements

- Seeds
- Polybags
- Plain Wire
- Tie Wire
- Wheel Barrow
- Cocoa Spades
- Garden Spades
- Shade Cloth

b) Field Management

- Grass knives
- Bush knives
- Files

- Secateurs
- Pole prunners
- Prunning saws

c) **Processing Facilities**

- Twines
- Needles
- Lining Ropes
- Cocoa Bags (Copra Sacks)
- Weighing Scales
- Cocoa Processing Facilities
  - **22 x 24' x 16'**

7. MANAGEMENT

7.1 Technical Know How

The OIC – Division of Primary Industry, Malasaet and Open Bay will be responsible for the supervision, co-ordination and managerial aspects of the project.

As the farmers have a fair experience of the crop, a close supervision will be on the processing to ensure quality beans are produced. Workshops and trainings will be conducted by the District Primary Industry – OIC's and field supervisors to ensure farmers are informed on the latest progress of the projects and the development of the crop.

7.2 Managerial Abilities

There won't be much major problems encountered, as technical officers responsible will closely assist farmers. Regular visits will be maintained to monitor the projects management and implementation process.

7.3 Administration Support

The District Administration of Gazelle District through the office of the District Rural Development Officer will co-ordinate and monitor the project. Proper records of the progress of the project will be maintained. Quarterly and annual reports will be submitted to the District Office on the stages of the project and for future references.

8. SOURCES OF FUND

All required funds for the establishment and operations of this project will come from the Agriculture Levy of the logging operation in the area.

8.1 Nursery Establishment

- Poly Bags	-	K 5,630.63
- Seeds	-	K14, 218.75
- Shade Cloth	-	K 8,525.00
- Plain Wire	-	K29, 400.00
- Nails/ Staples	-	K 200.00
- Hammer	-	K 50.00
- Tie Wire	-	K 350.00
- Wheel Barrow	-	K 1,050.00
- Cocoa Spades	-	K 400.00
- Garden Spades	-	K 280.00
Total		**K60, 104.38**

8.2 Field Management

- Tools - **K1000.00**

8.3 Processing Facilities

- Weighing Scales	-	K 260.00
- Cocoa Bags	-	K 324.00
- Fermentary/ Drier	-	K 20,000.00
Total		**K20, 584.00**

8.4 Grand Total

- K 60,104.38

- K 1,000.00
- K 20,584.00

- **K 81,688.38/ Incorporated Land Group.**

22x Incorporated Land Groups = K 1,797,144.36

9. SUMMARY OF COSTINGS

Table 1. Total Cost of Materials.

Activity	Per ILG (91Hectare)	Per 22ILG's (2,000 Ha)
Pre Development Stage	60,104.38	1,322,296.36
Field Development Stage	1,000.00	22,000.00
Post Harvest Stage	20,584.00	452,848.00
TOTAL	**81,688.38**	**1,797,144.36**

10. PROJECT IMPLEMENTATION

Implementation of this project will include work activities from the first year to the fifth year. Activities include nursery establishment, field establishment, field management, harvesting and processing.

10.1 Sequence Activities Of Work Programme - Nursery Establishment.

a) Under brushing and purchase of materials
b) Ground leveling and burning
c) Nursery construction
d) Soil cartage
e) Soil filling and lining of polybags
f) Purchase and planting of seeds
g) General maintenance
h) Field clearing and brushing

10.2 Field Development

a) Cutting of gliricidia for shade.
b) Lining and shade establishment
c) Holing and transportation of seedlings to the field
d) Field planting
e) Pruning of shade trees (Shade Control)
f) Weed Control
g) General Maintenance

h) Pest and disease control.
i) Pruning of cocoa trees

10.3 Harvesting, Processing & Marketing

a) Installation of cocoa fermentaries/driers
b) Harvesting
c) Processing and Marketing
d) Marketing

Table 2. Cocoa Development Project Time Frame.

Activity	2007	2008	2009	2010	2011
A. PRE DEVELOPMENT STAGE					
Nursery Development	3 months	Successive nursery programmes continue			
Land Preparation	3 months	Successive land preparation & clearances continue.			
B. FIELD DEVELOPMENT STAGE					
Lining/Shade Establishment Holing & Planting Weed Control/Pruning		6 months	Successive field development activities Continue for 3 years.		
C. HARVESTING AND PROCESSING STAGE					
Installation of Driers	-	3 months	Successive installation of driers.		
Harvesting & Processing	-	1 week	3 weeks	4 weeks	4 weeks

11. PRODUCTION FORECAST

The trees are expected to start bearing 18 months after planting when harvesting still commence. The first full year of production will be 36 months post planting. The crop will gradually increase with the successive planted areas peaking off in year five with an expected crop of 1.3 tonnes dry bean per hectare annually.

Table 3. Production Forecast of Dry Bean.

YEAR	2007	2008	2009	2010	2011
Harvest Year	-	1	2	3	4
Yield (Tonnes\ Hectare)	-	0.05	0.50	1.0	1.3
Yield (Tons\91 Hectares)	-	4.55	45.50	91.0	118.3

Table 4. Estimated Production Value (Kina).

Year	2	3	4	5
Per ILG	14,560.	145,600.	291,200.	378,560.
Per 22 ILG's	320,320.	3,203,200.	6,406,400.	8,328,320.

*Note: An average of K200.00\ Bag dry bean is being used in the above computations.

12. SWOT ANALYSIS

12.1 Strength

With the proposed road to be constructed and existing road maintained, there won't be major problems encountered in the transportation and delivery of operational materials and produces. Communal labour is still very strong which will be vital in the establishment and development stages. There are several buyers of dry cocoa beans (markets) available in the two LLG's, Kerevat, Rabaul and Kokopo.

12.2 Weaknesses

Pests and disease out break would be possible problems as well as natural disasters. There would not be any major managerial problems as they would be closely assisted and monitored by responsible field District Primary Industry extension officers.

12.3 Opportunities

Every households of the project area may expand their proposed blocks in future and benefit directly or indirectly from the proposed 2,000 hectares project. An improvement in their living standards in terms of housing and eating habits will encourage self-reliance within their community.

12.4 Threats

The only possible threats that would occur and have an impact on the proposed project would be,

- Land transport system especially during wet seasons
- Land ownership disputes
- Stealing
- Fluctuations of market prices in future.

TOTAL SUMMARY COSTING FOR COFFEE DEVELOPMENT FOR 1000/HA. TORIU INTERGRATED PROJECT

		TARGET ACTIVITY		COSTING
1.		**LABOUR REQUIREMENTS:**		
	a)	Land Clearance	:	300,000.00
	b)	Nursery Development Preparation	:	240,000.00
	c)	Drainage	:	120,000.00
	d)	Lining, Holing and Planting	:	360,000.00
		TOTAL:-	:	**K1,020,000.00**
2.		**NURSERY DEVELOPMENTS:**		
	a)	Seeds Requirements for 1000/ha.	:	3,333.00
3.		**MATERIAL REQUIREMENTS:**		
	a)	Polly Bags	:	205,282.00
	b)	Bush knives/Grass knives	:	57,728.00
	c)	Transport	:	75,000.00
		GRAND TOTAL:-	:	**K1,361,343.00**

TORIU INTERGRATED PROJECT

STRATEGIC COFFEE DEVELOPMENT PLAN
COSTING FOR 1000 HECTARES

ESTABLISHMENT PHASE:

1. **LABOUR REQUIREMENTS:**

a) **Land Clearance (from bush and grassland):**

50mdys/ha. X 1000ha = 50,000mdys.
= 50,000mdys x K6/mdy
= **K300,000.00**

b) **Nursery (coffee) Preparation:**

40mdys/ha. X 1000ha. = 40,000myds.
= 40,000myds x K6/mdy
= **K240,000.00**

c) **Drainage (depends on soil types and conditions):**

20myds/ha. X 1000ha = 20,000myds.
= 20,000myds x K6/mdy
= **K120,000.00**

d) **Lining, Holing and Planting:**

60mdys x 1000ha. = 60,000mdys.
= K60,000mdys x K6/mdy
= **K360,000.00**

TOTAL:- = **K1,020,000.00**

2. NURSERY DEVELOPMENTS:-

(a) Planting Density:

Coffee seeds will be planted at 1.5m x 2.5ma = 3.75m^2.
= 10,000m^2/ha. ÷ 3.75m^2 = 2,666 coffee trees
= 2,666 trees/ha. x 1000ha.
= 2,666,000 trees for 1000ha.

(b) Seeds Requirement:

4,400 seeds in 1kg parchment (seeds).
= 2,666,000 seeds ÷ 4,400 seeds
= 606kg seeds x K5.50/kg.
= K3,333.00

3. MATERIAL REQUIRMENTS:

(a) Polly Bags:

2,66,600 polly bags x 10% allowed for replacement.
= 2,66,600 + 2,666,000
= 2,932,600 x K0.07/polly bag
= K205,282.00

(b) Bush knives/Grass knives:

164 members/LLG x 22LLGs = 3,608 farmers.
= 3,608 bush knives @ K16/knife
= K57,728.00

(c) Transport (for mobility):

Transport for transportation of materials, supervision and other activities.
= 1 x Toyota hilux @ K75,000.00
= K75,000.00

TOTAL:- = K338,010.00

Attachment:

CARDAMON PROJECT - DEVELOPMENT PROPOSAL TORIU TIMBER AREA INLAND AND LASSUL LLGs, GAZELLE DISTRICT

1.0 INTRODUCTION

The Landowners of the Toriu Timber Area within the Inland and Lassul LLGs have proposed agriculture projects which they are looking at in conjunction with the East New Britain Provincial Government. They have proposed that 4,000 hectares be identified for agriculture development which will be clear felled and established in the two LLG areas on identified and allocated customary land areas.

The Landowners would like to plant up 22 blocks of cardamom within an area of about 182 hectares per ILG. In total the blocks would cover around 4,000 hectares for agriculture development.

This whole proposal takes account of the fact that we are an agriculturally based province with the Gazelle District having a vast potential in this area. Thus this project stems from the initiative of the landowners located within the Inland Baining and Lassul Baining Local Level Government.

2.0 BACKGROUND

The Landowners have proposed to establish and cultivate agricultural cash crops along the proposed road that will be constructed in conjunction with a logging operation in the same area through the involvement of an Agriculture and Roadline Timber Authority (TA) that would be obtained through an application from PNG Forest Authority (PNGFA).

Through their representatives, they have continuously voiced their support for the implementation of the agriculture and road project as soon as practicable. Concerns have been expressed to ensure that feeder roads must also be constructed radiating from the main road to service agricultural and other projects that will be located on suitable arable land some distance away from the propose main road, while others will still be established along the main road depending on the suitability of arable land.

Cardamon is one of the agriculture crops that has been identified for suitable areas in the Inland and Lassul LLG areas which is now growing there. It is being envisaged that large scale cardamon development will be undertaken in these areas to ensure sustainable economic activities are present in the area after the road construction and logging phases of the project lapsed.

Cardamom plantings is yet to be updated, but 1998 census shows the following here under is the existing and should increase by new plantings if it or when the census update is completed. Below are the list for Gazelle District Inland Baining LLG of the existing - 211 farmers
557 plants/clumbs
64.4ha.

About 64 hectares of the Cardamom Plant have been established in the Inland Baining Area. Research showed that one (1) hectare is sufficient to produce approximately one (1) ton but an hectare on the ground currently produce 700 – 800kg due to management practices.

3.0 PHYSICAL RESOURCES

3.1 Land

The land proposed for road construction and subsequent logging activities is customarily owned by the people from the area of which 4,000 hectares have been identified and earmarked for the development of cardamon as well as other agricultural crops for the twenty-two (22) Incorporated Land Groups (ILGs) of the particular area.

2.

3.2 Capital

Cardamon development in the area will be funded under the Agriculture Levy derived from the export of timbers/logs from the logging operation.

3.3 Manpower

Communal labour by the landowners will be involved in the implementation of the cardamon development project and establishment activities that would involve lining and shade establishments of the smallholder blocks for the 22 ILGs while the developer/contractor will have to undertake the clear felling operation for the agricultural areas.

3.4 Tools and Equipment

a) Nursery Requirements

- Cardamon splits/seeds
- Poly Bags
- Plain Wire
- Tie Wire
- Wheel barrow
- Cocoa Spades
- Garden Spades
- Shade Cloth

b) Field Management

- Grass knives
- Bush knives
- Files
- Secuteurs
- Pesticides
- Fertilizers

c) Processing Facilities

- Twines
- Needles
- Lining ropes
- Cardamon Bags (copra sacks)
- Weighing scales
- Seed trays
- Soda ash(chemical)
- Cardamon processing facilities (Fermentaries – 14' x 10')

4.0 MANAGEMENT

4.1 Technical Supervision and Advises

The OICs of the Division of Primary Industry's Malasaet and Open Bay DPI Stations will be responsible for the supervision, co-ordination and overall management of the project.

As farmers already have fair experiences of the crops to be involved in the project, close supervision will only be undertaken on the processing of the commodity to ensure quality products are produced. Workshops and trainings will be conducted by the District Primary Industry OICs and Field Supervisors to ensure farmers are informed on the latest progress of the projects and the development of the crop.

4.2 Managerial Abilities

There will not be much major problems encountered as technical officers responsible will closely assist farmers. Regular visits will be maintained to monitor the projects management and implementation process on the field.

4.3 Administration Support

The Administration of Gazelle District through the office of the District Rural Development Officer (DRDO) will co-ordinate and monitor the progress of the project. Proper records of the progress of the project will be maintained. Quarterly and annual reports will be submitted to the District Office on the stages of the project and for future references.

5.0 FUNDING SOURCES

All required funds for the establishment and operations of the project will come from the Agriculture Levy (K2/m^3) payable to the Landowner Company after the export of logs or timbers harvested from the Toriu Timber Area.

5.1 Nursery Establishment

MATERIALS	QUANTITY	COST/UNIT	TOTAL COSTS
Poly bags			K 5, 630.63
Cardamon splits/ seeds			K14, 218.75
Shade cloth			K 8, 525.00
Plain wire			K29, 400.00
Nails/Staples			K 200.00
Hammer			K 50.00
Tie wire			K 350.00
Wheel barrow			K 1, 050.00
Cocoa spades			K 400.00
Garden spades			K 280.00
Total			**K60, 104.38**

5.2 Field Management

- Field tools and equipment - **K1, 000.00**

5.3 Processing facilities

MATERIALS	QUANTITY	COST/UNIT	TOTAL COSTS
Weighing Scales			K 260.00
Cardamon bags			K 324.00
Fermentaries			K20, 000.00
Seed trays			K 1,200.00
Soda ash (chemical)			K 2,000.00
Total			**K23, 784.00**
Grand Total			**K84, 888.38/ILG**

Footnote:
For the 22 ILGs within the Toriu Forest Area, the grand total cost would amount to around **K1, 867, 544.36.**

6.0 PROJECT IMPLEMENTATION

The implementation of the project will include work activities from the first year (Y1) to the fifth year (Y5). Activities will include nursery establishment, field management, harvesting and processing.

6.1 Work Programme Sequence and Activities – Nursery Establishment

a) Under brushing and purchase of materials
b) Ground leveling and burning
c) Nursery construction
d) Soil cartage
e) Soil filling and lining of poly bags
f) Purchase of cardamom splits/seeds
g) General maintenance
h) Field clearing and brushing

6.2 Field Development

a) Preparation of cardamon shade trees planting material. (Leucaena & Albizia *sp.*)
b) Lining and shade establishment
c) Holing and transportation of seedlings to the field
d) Field planting
e) Pruning of shade trees (shade control)
f) Weed control
g) General maintenance
h) Pest and disease control
i) Pruning of cardamon plants

6.3 Harvesting, Processing and marketing

a) Construction/installation of cardamon fermentaries/dryers
b) Harvesting
c) Processing and marketing
d) Marketing

Cardamon Development Project Schedule

Activity	2007	2008	2009	2010	2011
A. Pre Development Stage					
Nursery Development	13 weeks Germinated bed nursery 9-11 months Polybag nursery 6-9 months nursery bedif no polybags available	Successive nursery programmes continues			
Land Preparation	3 months	Successive land preparation and clearances continues.			
B. Field Development Stage					
Lining/shade establishment Holing and planting Weed control/pruning		6 months	Successive filed development activities continue for three (3) years.		
C. Harvesting and Processing Stage					
Construction/ Installation of Dryers (fermentaries)	-	3 months	Successive construction/installation of dryers		
Harvesting and Processing	-	1 week	3 weeks	4weeks	4 weeks

8.0 PRODUCTION FORECAST

The cardamom plants are expected to start bearing at 18 months to 2 years after planting where harvesting is also expected to commence. The first full year of production will be 36 months post planting. The crop will gradually increase with the successive planted areas peaking off in year 3 with an expected crop yield of some 2000kg cardamom green bean per hectare annually.

Production forecast of cardamon beans for one(1) Ha

YEAR	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
INCOME												
Yield(kg)			300	2000	2000	2000	3500	4000	4000	4000	3500	3000
Sales(K/kg)			600	4000	4000	5000	7000	8000	8000	8000	7000	6000
COSTS												
Seed trays	80											
Nursery bags	50											
Shade cloth	90											
Nursery building	50											
Labour	1014	198	937	1152	1560	1560	1560	1560	1820	1820	1820	1820
Pesticide	50	70	70	70	80	80	80	90	90	90	90	90
TOTAL	1334	268	1006	1222	1640	1640	1640	1650	1910	1910	1910	1910
Net Cash Flow	-1334	-268	-406	2778	2360	3360	5360	6350	6180	6180	5180	4180
Cum.Cash Flow	-1334	-1602	-2008	770	3130	6490	11850	18200	24380	30560	35740	39920

Footnote

Assumptions:	Price	K2.00/Kg Green bean
	Spacing	3m x 3m
	Planting density	1089 plants per Ha
	Production period	13 years
	Seeds price	K0.80/Kg (Good quality seeds)